WHAT IS CLAIMED IS:

1. A microparticle comprised of an electrically conductive material having (a) one or more copies of an assay-ligand immobilized on its surface and (b) a plurality of electrochemiluminescent moieties immobilized on its surface.

2. A microparticle comprised of an electrically conductive material having a coating thereupon, and further comprising (a) one or more copies of an assay-ligand immobilized on said coating, and (b) a plurality of electrochemiluminescent moieties immobilized on said coating.

3. A microparticle comprised of an electrically conductive material having plurality of copies of an assay-ligand labeled with an electrochemiluminescent moiety immobilized on its surface.

4. A microparticle comprised of an electrically conductive material having a plurality of copies of a binding reactant labeled with an electrochemiluminescent moiety immobilized on its surface.

5. A microparticle comprised of an electrically conductive material having a plurality of copies of an immunoreactant labeled with an electrochemiluminescent moiety immobilized on its surface.

6. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) a microparticle comprised of an electrically conductive material having one or more copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with

(ii) an assay-ligand immobilized on an electrode; and

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

7. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) a microparticle comprised of an electrically conductive material having one or more copies of an assay-ligand immobilized on its surface and a plurality of electrochemiluminescent moieties immobilized on its surface; and

(ii) an assay-ligand immobilized on an electrode;

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

8. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) a microparticle comprised of an electrically conductive material having a plurality of copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with an assay-ligand immobilized on an electrode and being labeled with an electrochemiluminescent moiety; and

(ii) an assay-ligand immobilized on an electrode;

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

9. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) said analyte,

(ii) a microparticle having one or more copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte; and

(iii) an assay-ligand immobilized on an electrode.

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

10. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) said analyte,

(ii) a microparticle having one or more copies of a binding reactant immobilized on its surface, said binding reactant being specific for said analyte, and

(iii) a binding reactant immobilized on an electrode; and

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

11. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) said analyte,

(ii) a microparticle having one or more copies of an assay-ligand immobilized on its surface and a plurality of electrochemiluminescent moieties immobilized on its surface; and

(iii) an assay-ligand immobilized on an electrode.

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

12. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) said analyte,

(ii) a microparticle having a plurality of copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with an assay-ligand immobilized on an electrode and being labeled with an electrochemiluminescent moiety; and

(iii) an assay-ligand immobilized on an electrode.

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

13. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) said analyte,

(ii) a microparticle comprised of an electrically conductive material having one or more copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with (iii); and

(iii) an assay-ligand immobilized on an electrode; and

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

14. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) said analyte,

(ii) a microparticle having one or more copies of an assay-ligand immobilized on its surface and a plurality of electrochemiluminescent moieties immobilized on its surface; and

(iii) an assay-ligand immobilized on an electrode.

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

15. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) said analyte,

(ii) a microparticle comprised of an electrically conductive material having

one or more copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with an assay-ligand immobilized on an electrode and being labeled with an electrochemiluminescent moiety; and

(iii) an assay-ligand immobilized on an electrode;

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

16. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample comprising the steps of:

(a) forming a composition comprising

(i) said sample; and

(ii) a microparticle comprised of an electrically conductive material having one or more of copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with the assay-ligand recited in step (c);

(b) incubating said composition to form a complex;

(c) causing said complex to bind to an assay-ligand immobilized on an electrode; and

(d) conducting an electrochemiluminescence measurement in the presence of electrochemiluminescence reactants.

17. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample comprising the steps of:

(a) forming a composition comprising

(i) said sample;

(ii) a microparticle comprised of an electrically conductive material having one or more of copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with (iii); and

(iii) an assay-ligand immobilized on an electrode;

(b) incubating said composition to form a complex; and

(c) conducting an electrochemiluminescence measurement in the presence of electrochemiluminescence reactants.

18. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample comprising the steps of:

(a) forming a system comprising

(i) said sample; and

(ii) an assay-ligand immobilized on an electrode;

(b) incubating said system to form a complex;

(c) causing said complex to bind to a microparticle comprised of an electrically conductive material having one or more one or more copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with an assay-ligand; and

(d) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

19. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps of:

(a) forming a composition comprising

(i) said sample; and

(ii) a microparticle comprised of an electrically conductive material having one or more copies of an assay-ligand immobilized on its surface and a plurality of electrochemiluminescent moieties immobilized on its surface;

(b) incubating said composition to form a complex;

(c) causing said complex to bind to an assay-ligand immobilized on an electrode; and

(d) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

20. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps of:

(a) forming a composition comprising

(i) said sample; and

(ii) a microparticle comprised of an electrically conductive material having a plurality of copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with an assay-ligand and

being labeled with an electrochemiluminescent moiety;

(b) incubating said composition to form a complex;

(c) causing said complex to bind to an assay-ligand immobilized on an electrode; and

(d) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

21. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps:

(a) forming a system comprising

(i) said sample; and

(ii) a microparticle comprised of an electrically conductive material having one or more copies of an assay-ligand immobilized on its surface and a plurality of electrochemiluminescent moieties immobilized on its surface;

(iii) an assay-ligand immobilized on an electrode;

(b) incubating said system to form a complex; and

(c) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

22. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps:

(a) forming a system comprising

(i) said sample; and

(ii) a microparticle comprised of an electrically conductive material having a plurality of copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with an assay-ligand and being labeled with an electrochemiluminescent moiety;

(iii) an assay-ligand immobilized on an electrode;

(b) incubating said system to form a complex; and

(c) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

23. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest

present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps:

(a) forming a system comprising

(i) said sample; and

(ii) an assay-ligand immobilized on an electrode;

(b) incubating said system to form a complex;

(c) causing said complex to bind to a microparticle comprised of an electrically conductive material having one or more copies of an assay-ligand immobilized on its surface and a plurality of electrochemiluminescent moieties immobilized on its surface; and

(d) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

24. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps:

(a) forming a system comprising

(i) said sample; and

(ii) an assay-ligand immobilized on an electrode;

(b) incubating said system to form a complex;

(c) causing said complex to bind to a microparticle comprised of an electrically conductive material having a plurality of copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with an assay-ligand and being labeled with an electrochemiluminescent moiety; and

(d) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

25. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps:

(a) forming a system comprising

(i) said sample; and

(ii) a microparticle having one or more copies of an assay-ligand immobilized on its surface and a plurality of electrochemiluminescent moieties immobilized on its surface;

(b) incubating said composition to form a complex;

(c) causing said complex to bind to an assay-ligand immobilized on an electrode; and

(d) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

26. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps:

(a) forming a system comprising

(i) said sample; and

(ii) a microparticle having a plurality of copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with an assay-ligand and being labeled with an electrochemiluminescent moiety;

(b) incubating said composition to form a complex;

(c) causing said complex to bind to an assay-ligand immobilized on an electrode; and

(d) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

27. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps:

(a) forming a system comprising

(i) said sample; and

(ii) a microparticle having one or more copies of an assay-ligand immobilized on its surface and a plurality of electrochemiluminescent moieties immobilized on its surface;

(iii) an assay-ligand immobilized on an electrode;

(b) incubating said composition to form a complex; and

(c) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

28. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps:

(a) forming a system comprising

(i) said sample; and

(ii) a microparticle having a plurality of copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with an assay-ligand and being labeled with an electrochemiluminescent moiety;

(iii) an assay-ligand immobilized on an electrode;

(b) incubating said composition to form a complex; and

(c) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

29. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps:

(a) forming a system comprising

(i) said sample; and

(ii) an assay-ligand immobilized on an electrode;

(b) incubating said composition to form a complex; and

(c) causing said complex to bind to a microparticle having one or more copies of an

assay-ligand immobilized on its surface and a plurality of electrochemiluminescent moieties immobilized on its surface; and

(d) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

30. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps:

(a) forming a system comprising

(i) said sample; and

(ii) an assay-ligand immobilized on an electrode;

(b) incubating said composition to form a complex; and

(c) causing said complex to bind to a microparticle having a plurality of copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with an assay-ligand and being labeled with an electrochemiluminescent moiety; and

(d) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

31. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample comprising the steps of:

(a) forming a composition comprising

(i) said sample; and

(ii) a microparticle having one or more copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with the assay-ligand recited in step (c);

(b) incubating said composition to form a complex;

(c) causing said complex to bind to an assay-ligand immobilized on an electrode; and

(d) conducting an electrochemiluminescence measurement in the presence of electrochemiluminescence reactants.

32. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample comprising the steps of:

(a) forming a composition comprising

(i) said sample;

(ii) a microparticle having one or more copies of an assay-ligand immobilized on its surface, said assay-ligand being capable of binding with said analyte or with (iii); and

(iii) an assay-ligand immobilized on an electrode;

(b) incubating said composition to form a complex; and

(c) conducting an electrochemiluminescence measurement in the presence of electrochemiluminescence reactants.

33. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample comprising the steps of:

(a) forming a system comprising

(i) said sample; and

(ii) an assay-ligand immobilized on an electrode;

(b) incubating said system to form a complex;

(c) causing said complex to bind to a microparticle having one or more copies of an assay-ligand immobilized on its surface, said

assay-ligand being capable of binding with said analyte or with an assay-ligand; and

(d) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

34. A complex comprising:

(a) an analyte-of-interest;

(b) a microparticle having one or more copies of an assay-ligand immobilized on its surface and a plurality of electrochemiluminescent moieties immobilized on its surface; and

(c) an assay-ligand immobilized on an electrode.

35. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample comprising the steps of:

(a) forming a composition comprising

(i) said sample;

(ii) a microparticle comprised of an electrically conductive material; and

(iii) an assay-ligand immobilized on an electrode;

(b) incubating said composition to form a complex; and

(c) conducting an electrochemiluminescence measurement in the presence of electrochemiluminescence reactants.

36. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample comprising the steps of:

(a) forming a composition comprising

(i) said sample;

(ii) a microparticle comprised of an electrically conductive material, said microparticle having one or more copies of an assay-ligand and a plurality of electrochemiluminescent moieties immobilized on its surface; and

(iii) an assay-ligand immobilized on an electrode;

(b) incubating said composition to form a complex; and

(c) conducting an electrochemiluminescence measurement in the presence of electrochemiluminescence reactants.

37. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) a microparticle having one or more copies of an assay-ligand and plurality of electrochemiluminescent moieties immobilized on its surface; and

(ii) an assay-ligand immobilized on an electrode; and

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

38. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) a microparticle comprised of an electrically conductive material having one or more copies of an assay-ligand immobilized on its surface; and

(ii) an assay-ligand immobilized on an electrode; and

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

39. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) a microparticle comprised of an electrically conductive material, said mircroparticle having one or more copies of an assay-ligand and a plurality of electrochemiluminescent moieies immobilized on its surface; and

(ii) an assay-ligand immobilized on an electrode; and

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

40. A reagent for carrying out ECL assays for an analyte-of-interest comprising an assay-ligand, said assay-ligand being linked to a soluble polymer comprising a pluraility of electrochemiluminescence moieties.

41. A complex comprising:

(a) an analyte-of-interest

(b) an assay-ligand linked to a soluble polymer, said polymer comprising a plurality of electrochemiluminescent moieties.

(c) an assay ligand immobilized on an electrode.

42. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) an assay-ligand linked to a soluble polymer, said polymer comprising a plurailty of ECL moieties, said assay-ligand being capable of binding with said analyte or with;

(ii) an assay-ligand immobilized on an electrode; and

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

43. A method for conducting electrochemiluminescence measurements for a binding analyte-of-interest comprising the steps of:

(a) forming a complex comprising

(i) said analyte,

(ii) an assay-ligand linked to a soluble polymer, said polymer comprising a plurality of ECL moieties, said assay-ligand being capable of binding with said analyte; and

(iii) an assay-ligand immobilized on an electrode.

(b) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

44. A method for performing an electrochemiluminescence binding assay for an analyte-of-interest present in a sample based upon measurements of electrochemiluminescence at an electrode comprising the steps:

(a) forming a system comprising

(i) said sample; and

(ii) an assay-ligand linked to a soluble polymer, said polymer comprising a plurality of electrochemiluminescent moieties; and

(iii) an assay-ligand immobilized on an electrode;

(b) incubating said system to form a complex; and

(c) conducting an electrochemiluminescence measurement at said electrode in the presence of electrochemiluminescence reactants.

45. A metallic microparticle having a plurality of electrochemiluminescent moieties immobilized on its surface.

46. The microparticle of claim 1 wherein said microparticle is comprised of gold.

47. The microparticle of claim 1 wherein said microparticle comprises a carbon fibril.

48. The microparticle of claim 1 wherein said microparticle comprises a carbon-based particle.

49. The microparticle of claim 1 wherein said microparticle comprises a metal oxide.

50. The microparticle of claim 1 wherein said microparticle comprises a conductive polymer.

51. The microparticle of claim 1 wherein said microparticle comprises a semi-conductor material.

52. The microparticle of claim 1 wherein said microparticle comprises silicon dioxide.

53. The microparticle of claim 1 wherein said microparticle comprises an organic polymer.

54. The microparticle of claim 1 wherein said conductive material is light-transmissive.

55. The microparticle of claim 1 wherein said microparticle has a size of from 5nm-10 micrometer.

56. The microparticle of claim 1 wherein said microparticle has a size of from 20nm-200nm.

59. The microparticle of claim 1 wherein said microparticle is comprised of a highly conductive material.

60. The microparticle of claim 1 wherein said microparticle is comprised of a very highly conductive material.

61. The microparticle of claim 1 wherein the number of said electrochemiluminescent moieties is greater than 100.

62. The microparticle of claim 1 wherein said microparticle is comprised of an ECL-active electrode material.

63. The method of claim 6 wherein said microparticle is comprised of gold.

64. The method of claim 6 wherein said microparticle comprises a carbon fibril.

65. The method of claim 6 wherein said microparticle comprises a carbon-based particle.

66. The method of claim 6 wherein said microparticle comprises a metal oxide.

67. The method of claim 6 wherein said microparticle comprises a conductive polymer.

68. The method of claim 6 wherein said microparticle comprises a semi-conductor material.

69. The method of claim 6 wherein said microparticle comprises silicon dioxide.

70. The method of claim 6 wherein said microparticle comprises an organic polymer.

71. The method of claim 6 wherein said conductive material is light-transmissive.

72. The method of claim 6 wherein said microparticle has a size of from 5nm-10 micrometer.

73. The method of claim 6 wherein said microparticle has a size of from 20nm-200nm.

74. The method of claim 6 wherein said microparticle is comprised of a very highly conductive material.

75. The method of claim 6 wherein said microparticle is comprised of a highly conductive material.

76. The method of claim 6 wherein the number of said electrochemiluminescent moieties is greater than 100.

77. The method of claim 6 wherein said microparticle is comprised of an ECL-active electrode material.